HIGH NESTING DENSITY OF BIRDS OF PREY NEAR KEVIN, MONTANA

Kristi DuBois
1988

I. INTRODUCTION

The Kevin Rim is a small sandstone escarpment surrounded by relatively flat topography, about 20 miles northwest of Shelby, Montana. Surface and sub-surface ownership is primarily Bureau of Land Management (BLM) lands covered by the West HiLine Resource Management Plant (RMP). These lands were suspected to contain high value raptor habitats, as well as important oil and gas resources. This survey was funded by the BLM to provide information on raptor populations and nest site locations, in order to provide better resource management. Newly-implemented guidelines for the West HiLine RMP call for protection of raptor nests and other important wildlife areas by providing buffer zones around nests and conducting potentially disturbing activities when the birds are not nesting.

II. STUDY AREA DESCRIPTION

The Kevin Rim study area consisted of 23.8 km^2 (5880 acres) of BLM land in several tracts along the Kevin Rim, and adjacent private and state lands Figure 1). Elevations ranged from 1030 to 1306 meters (3380 to 4285 ft). Grasslands were the dominant habitat in the study area. The private land surrounding the study area was dominated by strip-cropping for small grains. Major habitats on the BLM land along the Kevin Rim were grasslands and sagebrush (72%), badlands (grasslands exhibiting rugged topography and sparse vegetative cover (21%), cliffs and very steep, eroded hillsides (4%), shrubby wooded draws (2.5%), and deciduous tree wooded draws (0.5%). The sheer sandstone cliffs along the Kevin Rim were discontinuous, and interspersed with steep, eroded hillsides. Cliff faces mainly faced east, southeast, and south.

Surface water on the study area consisted of several man-made ponds and a few natural playas. Many of these were dry during the 1988 field season. A few springs and seeps were found in the coulees draining the Rim, but many coulees were too dry to support even small shrubs such as snowberry. Most of the shrubby draws consisted of snowberry (Symphoricarpos sp.), chokecherry (Prunus virginiana), juneberry (Amelanchier alnifolia), and wild rose (Rosa sp.). Several draws contained relict stands of water birch (Betula occidentalis). The Kevin Rim supported few trees. Only two major stands of trees were located. One was a cottonwood (Populus sp.) stand located on state school trust land, and the other was a relict aspen (Populus tremuloides) stand located on BLM land.

The study area was located within the 163.6 km^2 (40,480 acre) Kevin-Sunburst oil and gas field (Figure 2). Oil was first discovered in this field in 1922, and by 1930 approximately 400 oil or gas wells had been drilled. The Discovery Well was located near the edge of the study area, so many of the early wells were probably drilled quite close to the Rim. Within the Kevin-Sunburst Field, spacing regulations allow for 9 oil wells per 40 acres. In 1983, there were 931 oil wells and 60 gas wells in production in the Kevin-Sunburst Field. An estimated 150 wells (primarily oil) were in production in or adjacent to the study area during 1988.

Figure 1. BLM lands comprising the 23.8 square kilometer Kevin Rim study area, northcentral Montana, 1988.

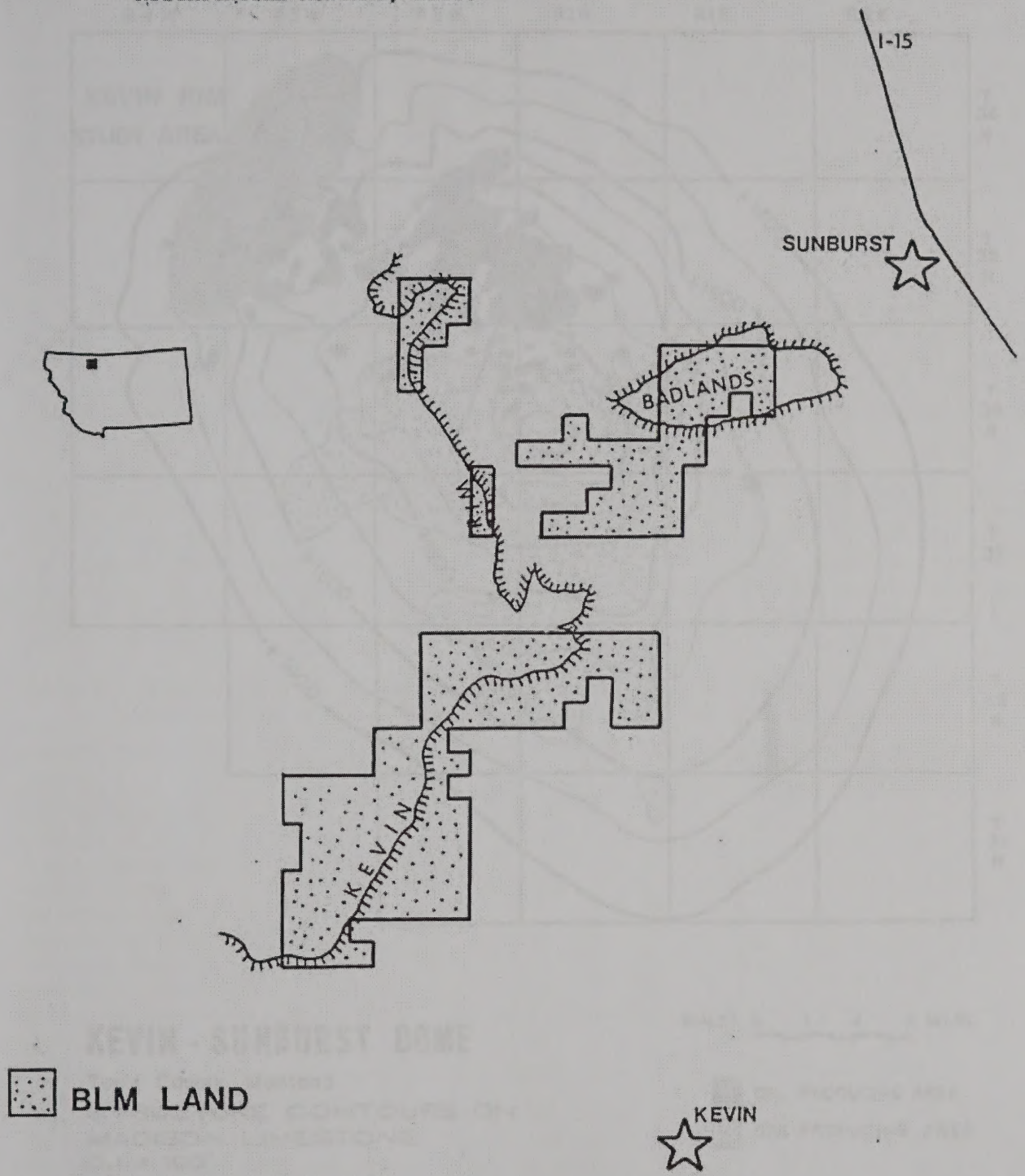
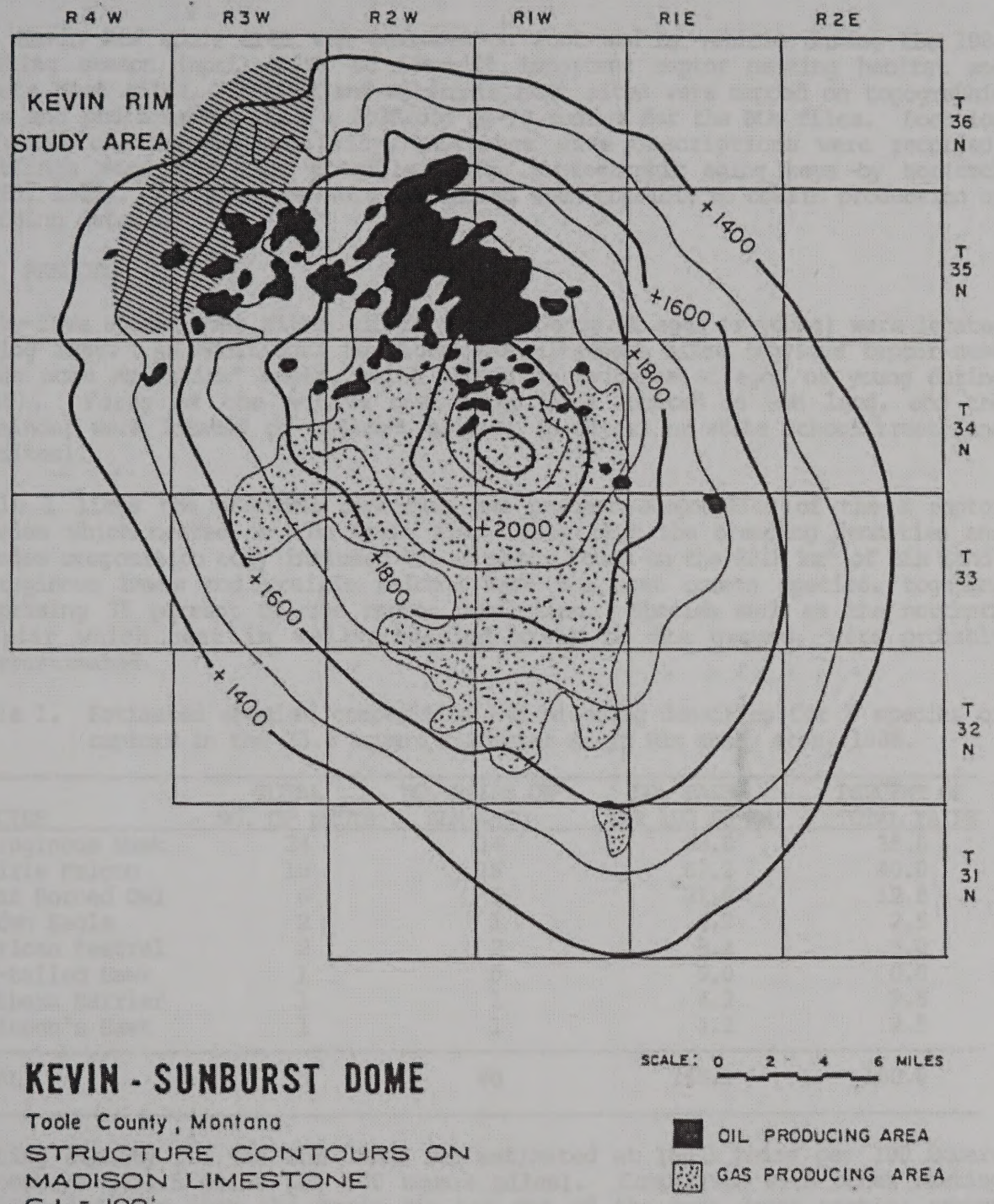
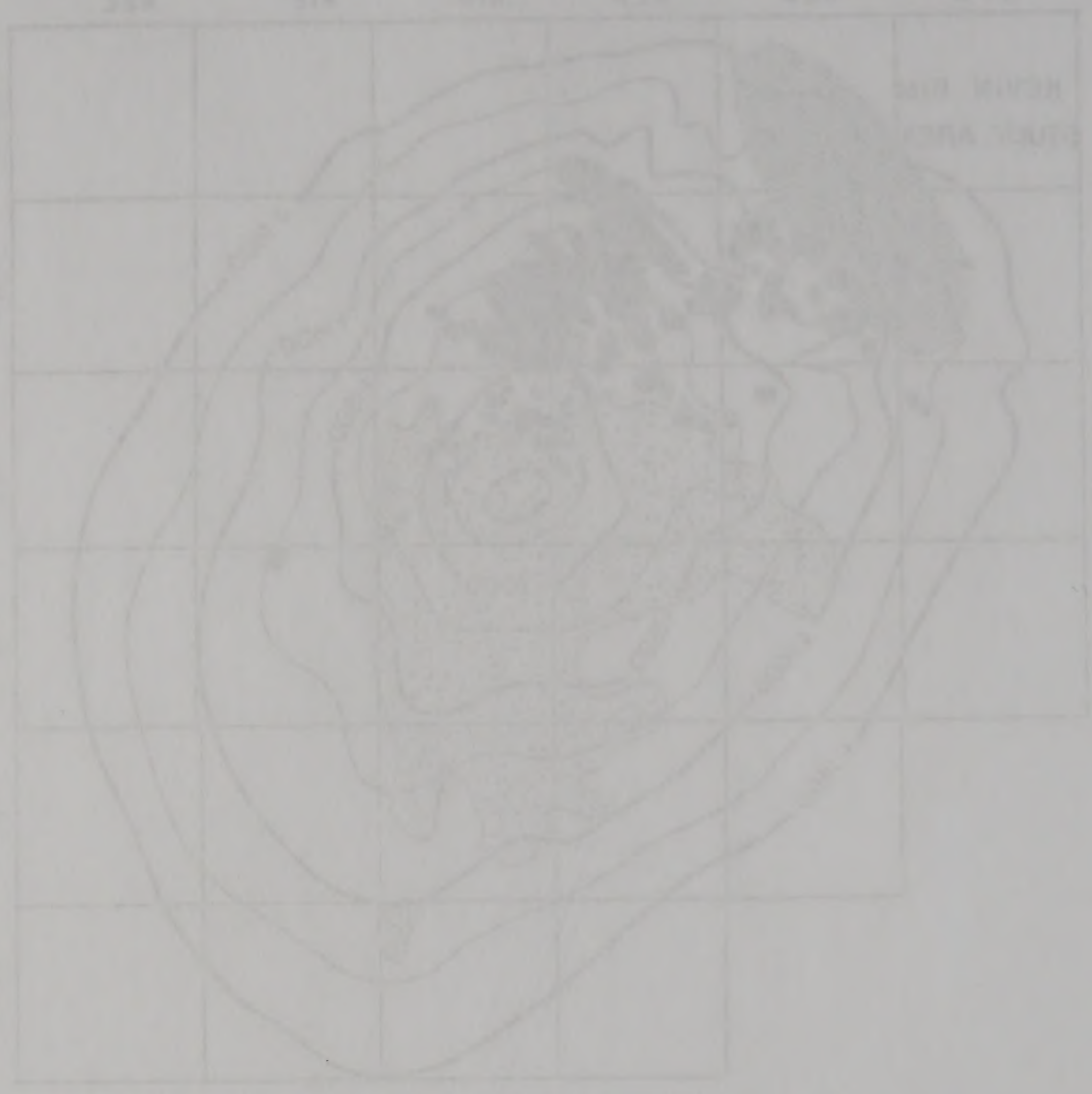


Figure 2. Location of the Kevin Rim study area in relation to the 163.6 square kilometer Kevin-Sunburst oil and gas field, northcentral Montana, 1988.





III. METHODS

The Kevin Rim study area was searched on foot and by vehicle during the 1988 nesting season (April-July) to identify important raptor nesting habitat and locate nest sites. Active and alternate nest sites were mapped on topographic maps and photographed with a Polaroid SX-70 camera for the BLM files. Location information, nesting activity, and nest site descriptions were recorded. Nestlings were aged when possible, using photographic aging keys by Moritsch (1983, 1985). Active nests were re-visited when possible to obtain production or fledging data.

IV. RESULTS

Fifty-five active nest sites (displaying evidence of eggs or young) were located during 1988. An additional 50 sites were alternate sites (obvious raptor nest sites such as "stick" nests, which showed no evidence of eggs or young during 1988). Forty of the active nest sites were located on BLM land, and the remainder were located on adjacent private (8 sites) or state school trust land (7 sites).

Table 1 lists the breeding densities and percent composition of the 8 raptor species which nested on the Kevin Rim. Note that the breeding densities and species composition only included the 40 nests found on the 23.8 km^2 of BLM land. Ferruginous hawks and prairie falcons were the most common species, together comprising 75 percent of the raptor population. Species such as the northern harrier which nest in well-concealed sites on the ground, were probably underestimated.

Table 1. Estimated species composition and breeding densities for 8 species of raptors in the 23.8 square kilometer Kevin Rim study area, 1988.

SPECIES	TOTAL NO. OF NESTS	NO. PAIRS ON BLM LAND	NO. PAIRS PER 100 SQ KM	PERCENT OF TOTAL PAIRS
Ferruginous Hawk	24	14	58.8	35.0
Prairie Falcon	18	16	67.2	40.0
Great Horned Owl	6	5	21.0	12.5
Golden Eagle	2	1	4.2	2.5
American Kestrel	2	2	8.4	5.0
Red-tailed Hawk	1	0	0.0	0.0
Northern Harrier	1	1	4.2	2.5
Swainson's Hawk	1	1	4.2	2.5
TOTAL	55	40	168.1	100.0

Nesting density for the BLM lands was estimated at 168.1 pairs per 100 square kilometers (434.5 pairs per 100 square miles). Comparison with other nesting studies indicate that the Kevin Rim has one of the most dense nesting raptor populations in the Western U.S. (Table 2). This nesting density estimate is probably underestimated because: 1) some nests of species which conceal their nests in cliff holes or on the ground were probably missed, 2) some nests may

have failed before being located, resulting in their being classified incorrectly as inactive nests, and 3) a small portion of the study area was not covered, or was only "glassed" from a distance, leaving the chance of overlooking nests.

Table 2. Comparison of the raptor nesting density in the Kevin Rim study area, Montana, with areas in other western states.

STUDY AREA	STUDY AREA SIZE (KM^2)	NO. PAIRS	NO. PAIRS PER 100 KM^2
BPNA, Idaho (Howard et al. 1976)	135.0	294	217.8
Kevin Rim, Montana	**23.8**	**40**	**168.1**
Grandview, Idaho (Howard et al. 1976)	117.0	163	139.3
Moose, Wyoming (Craighead and Mindell 1981)	31.1	24.7	79.3
Dunn County, North Dakota (Postovit 1979)	233.0	124	53.2
Cedar Valley, Utah (Smith and Murphy 1973)	207.0	35	16.9
Rocky Mountain Front, Montana (DuBois 1984)	4700.0	446	9.5
Pawnee, Colorado (Olendorff 1975)	2590.0	159	6.1
Hanford, Washington (Olendorff 1973)	1036.0	44	4.2
Southern Idaho (Howard et al. 1976)	12437.0	464	3.7
Medicine Bow, Wyoming (Oakleaf 1978)	3626.0	111	3.1
TOTAL FOR ALL AREAS	21509.9	1904.7	8.8

The high nesting density was suspected to be due largely to an abundant prey base consisting primarily of Richardson's ground squirrels (Spermophilus richardsonii) and white-tailed jackrabbits (Lepus townsendii). No food habits or prey base studies were conducted to confirm this hypothesis.

At least 37 of the 55 active nests were known to have produced young during 1988. Two nests apparently failed to produce young, and no information was obtained for the remaining 16 nests. Young which survived to be nearly fully covered with feathers were assumed to have fledged. Average brood sizes for 29 nests for which fledging counts were made were: ferruginous hawk - 2.8 (18 nests), golden eagle - 2.0 (2 nests), great horned owl - 2.5 (4 nests), and prairie falcon - 2.0 (6 nests). Brood sizes for many nests may have been underestimated due to the limited observation time.

The population of ferruginous hawks on the Kevin Rim appeared to have an unusually high proportion of dark phase birds. The color phase was noted for 23 adult ferruginous hawks which could be directly associated with a nest. Six of these adults (26%) were dark phase. These six birds were associated with 6 nests out of 16 (37.5%) where the color phase was noted for at least one of the adults. Color phase of the young was only noted at one nest, of which the adults were 1 light and 1 dark phase. The young produced were 2 dark and 1 light. The proportion of dark phase birds may have been overestimated, since color was not noted for all individuals. The reported incidence of dark-phase birds in other ferruginous hawk populations ranges from less than 1% in northcentral South Dakota to 9.4% in southeastern Alberta (Konrad and Gilmer 1988).

V. DISCUSSION

Quantification of the impacts of oil and gas development on raptors of the Kevin Rim was not within the scope of this study. A casual observer might conclude that oil and gas development does not significantly impact raptors, due to the close proximity of the nesting area to an actively-producing oil field. Some direct observations indicated that further study would be necessary to conclude that no significant impact is occurring.

Although the primary nesting areas were fairly close to the oil fields, most active nests were at least 1/2 mile from producing wells. Many nests close to wells had visual barriers between them and the wells. One nest was a notable exception. It was in full view and within 1/2 mile of at least 3 pumping oil wells, and had a non-pumping oil well and its associated oil spill directly below the nest. This nest successfully fledged 2 young.

A complete evaluation of the impacts of the oil and gas field would require a comparison of nest production and feeding behavior between nests close to oil wells and nests far from wells. The high raptor population was probably present in spite of oil and gas development, due to high prey populations. Raptors will sometimes use less desirable nest sites in order to take advantage of high prey populations (Bent 1938), resulting in birds nesting closer to development than they would normally.

The Kevin/Sunburst Oil Field has been in production at least since the 1930's. Wildlife will sometimes develop tolerance to development over a long period of time, if the development does not result in direct mortality (Ellis 1981). A classic example is the peregrine falcon that nested on the Sun Life Building in Montreal (Hickey 1969).

Other studies have shown that raptors may become "sensitized" to disturbance, becoming less tolerant after repeated disturbances (Thurow et al. 1980). One pair of ferruginous hawks on the Kevin Rim appeared to exhibit this type of response to the investigator, becoming more violently aggressive with successive nest checks. This particular pair was not nesting near or in view of any oil wells.

Indirect impacts of development may become more significant over the long run. Road-building can result in easier public access, which can result in more disturbance to the birds and higher poaching mortality. During the short duration of this study, one illegally-killed golden eagle was found near a jeep trail, directly below an active golden eagle nest. The eagle was an immature older than 1 year, and was probably not associated with the nest. The carcass was mostly decomposed, but showed possible evidence of having been shot (the bones in one wing were shattered and a small, round hole was located in the breast bone on one side). The head, feet, and tail were missing. The eagle nest in the area appeared to have 2 adults in attendance and contained young that were within 2-3 weeks of fledging.

Another possible impact of roads is loss of habitat, resulting in lower prey populations. Oil fields in the Kevin Rim often had numerous unneeded roads, forming a spider-web like network between oil wells. Many of the roads were

severely damaged due to use during wet weather. People avoided large mud holes by driving around them, resulting in the roads being wider than necessary and further increasing the amount of damaged land. Private land surrounding the Rim has been extensively converted to small grain production, increasing the importance of protection of native vegetation on the public lands. Healthy native vegetation is necessary to sustain adequate prey populations and provide natural diversity.

Many of the wells in the Kevin/Sunburst Field had associated oil spills. An enormous oil spill was located at the old refinery at Kevin. Pits at pumping sites to collect water separated from the oil were poorly fenced or not fenced at all. Oil was observed to be leaking into surface water (creeks) at two different sites. The scarcity of surface water on the Kevin Rim increases the value of the existing water to both wildlife and livestock.

VI. CONCLUSIONS

The Kevin Rim study area contained unusually high nesting densities of raptors and a ferruginous hawk population with higher than average percentages of dark phase birds. The BLM lands on the Kevin Rim provided islands of native grassland habitats in a sea of small-grain agricultural lands. Several stands of aspen and water birch represented relict plant communities normally found many miles to the north or west in more mountainous areas. The BLM has recognized the unique values of this area by classifying it as an Area of Critical Environmental Concern. These unique values should be protected through careful planning of future energy developments and management practices.

VII. LITERATURE CITED

Bent, A.C. 1938. Life histories of North American birds of prey. U.S. Natl. Mus. Bull. No. 170, pt. 2. Washington, D.C. 482 pp.

Craighead, F.C.,Jr. and D.P. Mindell. 1981. Nesting raptors in western Wyoming, 1947 and 1975. J. Wildl. Manage. 45(4):865-872.

DuBois, K.L. 1984. Rocky Mountain Front Raptor Survey, Final Report. Montana Dept. Fish, Wildl. and Parks, Helena, MT. 116 pp.

Ellis, D.H. 1981. Responses of raptorial birds to low level military jets and sonic booms. Inst. for Raptor Studies, Oracle, Ariz., 59 pp.

Hickey, J.J., Ed. 1969. Peregrine falcon populations - their biology and decline. Univ. of Wis. Press, Madison, WI. 596 pp.

Howard, R.P., L.O. Wilson, and F.B. Renn. 1976. Relative abundance of nesting raptors in southern Idaho. Raptor Res. 10(4):120-128.

Konrad, P.M. and D.S. Gilmer. 1988. Incidence of black-phase plumage in ferruginous hawks nesting in central North Dakota. Raptor Res. 22(3):92-93.

Moritsch, Marc Q. 1983. Photographic guide for aging nestling prairie falcons. U.S.D.I. Bureau of Land Management, Snake River Birds of Prey Project, Boise District, Idaho.

Moritsch, Marc Q. 1985. Photographic guide for aging nestling ferruginous hawks. U.S.D.I. Bureau of Land Management, Snake River Birds of Prey Project, Boise District, Idaho.

Oakleaf, R.J. 1978. Medicine Bow raptor nesting survey. Prog. Rep., Wyoming Game and Fish Dept., 10 pp + Appendix.

Olendorff, R.R. 1973. Raptorial birds of the USAEC, Hanford Reservation, Southcentral Washington. Battle Pacific Northwest Labs. Rep. No. BNWL-1790 UC-11. 45 pp.

Olendorff, R.R. 1975. Population status of large raptors in northeastern Colorado - 1970-1972. Pages 185-205 in J.R. Murphy, C.M. White, and B.E. Harrell, ed., Population status of raptors. Raptor Res. Rep. No. 3.

Postovit, H.R. 1979. Population estimates of breeding raptors in North Dakota badlands. MS Thesis, North Dakota State University, Fargo, N.D.

Smith, D.G. and J.R. Murphy. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. Brigham Young Univ. Sci. Bull., Biol. Ser. 18(3):1-76.

Thurow, T.L., C.M. White, R.P. Howard, and J.F. Sullivan. 1980. Raptor ecology of Raft River Valley, Idaho. U.S. Dept. of Energy, Idaho Operations Office, Idaho Natl. Eng. Lab. EGG-2054. 45 pp.